

| L Number | Hits | Search Text | DB | Time stamp |
|-------------|------|--|---|---------------------|
| 1 | 2283 | wire and (623/1.\$.ccls. or 623/23.\$.ccls.) | USPAT; US-PGPUB; EPO; JPO; DERWENT | 2003/02/27 15:39 |
| 2 | 134 | (wire and (623/1.\$.ccls. or 623/23.\$.ccls.)) and wire with thread | USPAT; US-PGPUB; EPO; JPO; DERWENT | 2003/02/27 15:56 |
| 3 | 1487 | (606/191,198).CCLS. | USPAT; US-PGPUB; EPO; JPO; DERWENT | 2003/02/27 16:16 |
| 4 | 671 | (623/1.2,1.16,1.13,2.38,2.4,2.40,1.20).CCLS | USPAT; US-PGPUB; EPO; JPO; DERWENT | 2003/02/27 16:18 |

| Document | US | Serial | Issue Date | On Page |
|----------|------------|--------|--------------|---------|
| 1 | US 3593342 | | USP 19710720 | 6 |
| 2 | US 3620218 | | USP 19711116 | 6 |
| 3 | US 3663965 | | USP 19720523 | 5 |
| 4 | US 3683926 | | USP 19720815 | 5 |
| 5 | US 3726284 | | USP 19730410 | 8 |
| 6 | US 3745995 | | USP 19730717 | 9 |
| 7 | US 3765032 | | USP 19731016 | 6 |
| 8 | US 3783868 | | USP 19740108 | 11 |
| 9 | US 3826241 | | USP 19740730 | 4 |
| | US 3833940 | | USP 19740910 | 4 |
| 11 | US 3848578 | | USP 19741119 | 4 |
| 12 | US 3852045 | | USP 19741203 | 17 |
| 13 | US 3866248 | | USP 19750218 | 5 |
| 14 | US 3881199 | | USP 19750506 | 6 |
| 15 | US 3882845 | | USP 19750513 | 15 |
| 16 | US 3896806 | | USP 19750729 | 6 |
| 17 | US 3906550 | | USP 19750923 | 6 |
| 18 | US 3964473 | | USP 19760622 | 4 |
| 19 | US 3982543 | | USP 19760928 | 11 |
| 20 | US 4015607 | | USP 19770405 | 5 |
| 21 | US 4038703 | | USP 19770802 | 7 |
| 22 | US 4041931 | | USP 19770816 | 4 |
| 23 | US 4044404 | | USP 19770830 | 9 |
| 24 | US 4062834 | | USP 19771213 | 6 |
| 25 | US 4064567 | | USP 19771227 | 6 |
| 26 | US 4073999 | | USP 19780214 | 12 |
| 27 | US 4074366 | | USP 19780221 | 8 |
| 28 | US 4080666 | | USP 19780328 | 4 |
| 29 | US 4089071 | | USP 19780516 | 11 |
| 30 | US 4097935 | | USP 19780704 | 19 |
| 31 | US 4108161 | | USP 19780822 | 6 |
| 32 | US 4140126 | | USP 19790220 | 4 |
| 33 | US 4153953 | | USP 19790515 | 6 |
| 34 | US 4163292 | | USP 19790807 | 5 |
| 35 | US 4184922 | | USP 19800122 | 7 |
| 36 | US 4195367 | | USP 19800401 | 13 |
| 37 | US 4214587 | | USP 19800729 | 8 |
| 38 | US 4214322 | | USP 19800729 | 13 |

United States Patent [17]

Hartenbach

[17] 3,833,940

[45] Sept. 10, 1974

OTHER PUBLICATIONS

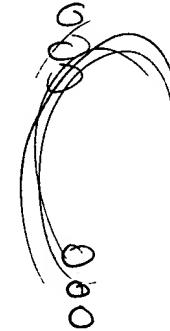
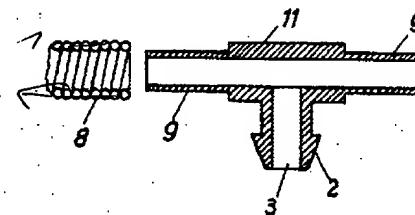
Surgical Drains, Catalogue of Catheters & Accessories, American Cystoscope Makers, Inc., 1960, page 64.
 Bile Duct Tubes, Pearse Type, Vitallium Surgical Appliances Catalog, Austenal Laboratories, Inc., New York-Chicago, 1948, page 23.

Primary Examiner—Richard A. Gaudet
 Assistant Examiner—Ronald L. Franks
 Attorney, Agent, or Firm—Hauke, Gifford, Patalidis & Dumont

[57] ABSTRACT

A bile duct endoprosthesis having a metal or plastic cannula for introduction into the bile duct and having rounded or beveled ends to aid in insertion and a radially extending portion which serves as a means for attaching a drain hose to the cannula and also as a means for insuring against longitudinal displacement of the cannula after it has been positioned within the bile duct. The cannula has two discrete end sections which are detachable joined to a push on frictional type connector that enables easier implantation of the cannula within a bile duct.

8 Claims, 5 Drawing Figures



| Document | I | K | Serial | Da | Page |
|----------|------------|---|-------------|----|------|
| 1 | US 3593342 | | USP19710720 | 6 | P |
| 2 | US 3620218 | | USP19711116 | 6 | C |
| 3 | US 3663965 | | USP19720523 | 5 | B |
| 4 | US 3683926 | | USP19720815 | 5 | T |
| 5 | US 3726284 | | USP19730410 | 8 | R |
| 6 | US 3745995 | | USP19730717 | 9 | A |
| 7 | US 3765032 | | USP19731016 | 6 | I |
| 8 | US 3783868 | | USP19740108 | 11 | P |
| 9 | US 3826241 | | USP19740730 | 4 | I |
| 10 | US 3833940 | | USP19740910 | 4 | B |
| 11 | US 3848578 | | USP19741119 | 4 | V |
| 12 | US 3852045 | | USP19741203 | 17 | V |
| 13 | US 3866248 | | USP19750218 | 5 | C |
| 14 | US 3881199 | | USP19750506 | 6 | U |
| 15 | US 3882845 | | USP19750513 | 15 | M |
| 16 | US 3896806 | | USP19750729 | 6 | I |
| 17 | US 3906550 | | USP19750923 | 6 | P |
| 18 | US 3964473 | | USP19760622 | 4 | B |
| 19 | US 3982543 | | USP19760928 | 11 | R |
| 20 | US 4015607 | | USP19770405 | 5 | E |
| 21 | US 4038703 | | USP19770802 | 7 | P |
| | US 4041931 | | USP19770810 | 4 | |
| 23 | US 4044404 | | USP19770830 | 9 | F |
| 24 | US 4062834 | | USP19771213 | 6 | M |
| 25 | US 4064567 | | USP19771227 | 6 | P |
| 26 | US 4073999 | | USP19780214 | 12 | P |
| 27 | US 4074366 | | USP19780221 | 8 | P |
| 28 | US 4080666 | | USP19780328 | 4 | I |
| 29 | US 4089071 | | USP19780516 | 11 | M |
| 30 | US 4097935 | | USP19780704 | 19 | H |
| 31 | US 4108161 | | USP19780822 | 6 | G |
| 32 | US 4140126 | | USP19790220 | 4 | M |
| 33 | US 4153953 | | USP19790515 | 6 | P |
| 34 | US 4163292 | | USP19790807 | 5 | H |
| 35 | US 4184922 | | USP19800122 | 7 | D |
| 36 | US 4195367 | | USP19800401 | 13 | L |
| 37 | US 4214587 | | USP19800729 | 8 | A |
| 38 | US 4214322 | | USP19800729 | 13 | L |
| 39 | US 4216548 | | USP19800812 | 13 | L |
| 40 | US 4261063 | | USP19810414 | | T |
| 41 | US 4274164 | | USP19810623 | | E |

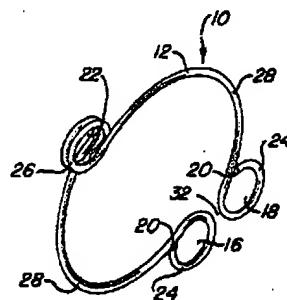


Fig. 1

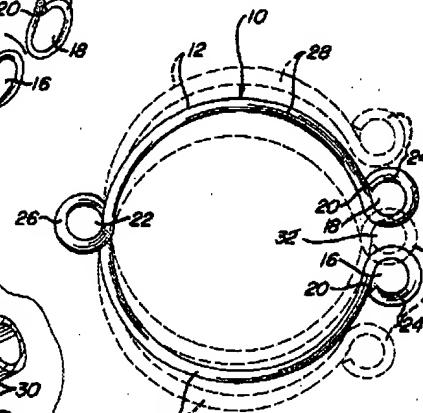


Fig. 2

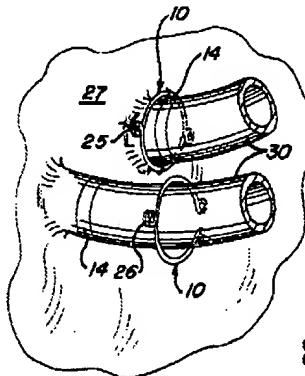


Fig. 4

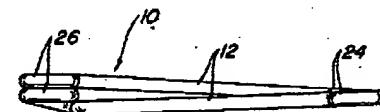


Fig. 3

| Document | I | K | Serial | Issue Date | Page | Page |
|----------|------------|---|-------------|------------|------|------|
| 123 | US 4938774 | | USP19900703 | 5 | D | |
| 124 | US 4938772 | | USP19900703 | 5 | F | |
| 125 | US 4938770 | | USP19900703 | 6 | S | |
| 126 | US 4950227 | | USP19900821 | 10 | S | |
| 127 | US 4954126 | | USP19900904 | 14 | P | |
| 128 | US 4955911 | | USP19900911 | 5 | B | |
| 129 | US 4955899 | | USP19900911 | 11 | L | |
| 130 | US 4963151 | | USP19901016 | 17 | R | |
| 131 | US 4969904 | | USP19901113 | 5 | B | |
| 132 | US 4969902 | | USP19901113 | 7 | I | |
| 133 | US 4969458 | | USP19901113 | 10 | I | |
| 134 | US 4976738 | | USP19901211 | 5 | P | |
| 135 | US 4978355 | | USP19901218 | 6 | P | |
| 136 | US 4986809 | | USP19910122 | 12 | P | |
| 137 | US 4988359 | | USP19910129 | 5 | F | |
| 138 | US 4990163 | | USP19910205 | 14 | M | |
| 139 | US 4997445 | | USP19910305 | 7 | M | |
| 140 | US 5002579 | | USP19910326 | 17 | P | |
| 141 | US 5007926 | | USP19910416 | 6 | E | |
| 142 | US 5011486 | | USP19910430 | 11 | C | |
| 143 | US 5013324 | | USP19910507 | 11 | P | |
| 144 | US 5015253 | | USP19910514 | 7 | N | |
| 145 | US 5019102 | | USP19910528 | 10 | A | |
| 146 | US 5019090 | | USP19910528 | 13 | R | |
| 147 | US 5019085 | | USP19910528 | 6 | A | |
| 148 | US 5021063 | | USP19910604 | 6 | J | |
| 149 | US 5030236 | | USP19910709 | 14 | A | |
| 150 | US 5030233 | | USP19910709 | 11 | P | |
| 151 | US 5032129 | | USP19910716 | 4 | A | |
| 152 | US 5035713 | | USP19910730 | 9 | S | |
| 153 | US 5035712 | | USP19910730 | 8 | S | |
| 154 | US 5037442 | | USP19910806 | 7 | F | |
| 155 | US 5041126 | | USP19910820 | 11 | E | |
| 156 | US 5049157 | | USP19910917 | 7 | R | |
| 157 | US 5059211 | | USP19911022 | 7 | A | |
| 158 | US 5061288 | | USP19911029 | 7 | D | |
| 159 | US 5061275 | | USP19911029 | 12 | S | |
| 160 | US 5064435 | | USP19911112 | 3 | S | |
| 161 | US 5078736 | | USP19920107 | 10 | M | |
| 162 | US 5084064 | | USP19920128 | 6 | S | |
| 163 | US 5089006 | | USP19920218 | 7 | B | |

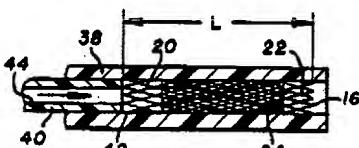


FIG. 2

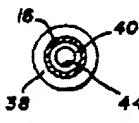


FIG. 3

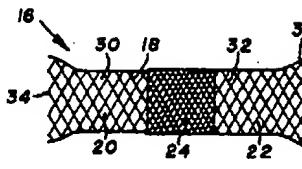


FIG. 1

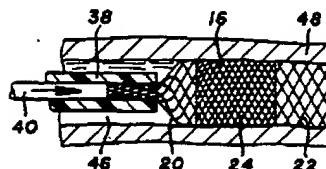


FIG. 4

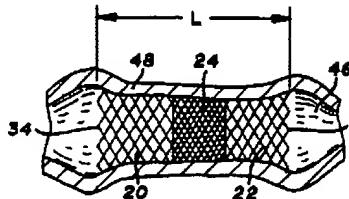


FIG. 5

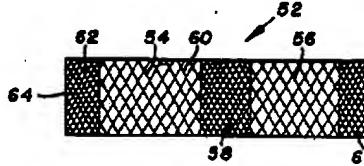


FIG. 6

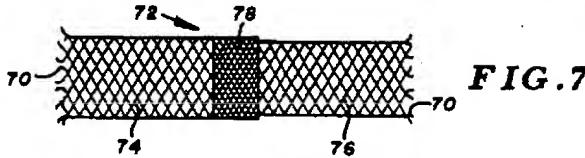


FIG. 7

| Document | I | K | Serial | Issue Date | Page | C |
|----------|------------|---|-------------|------------|------|---|
| 291 | US 5443510 | | USP19950822 | 5 | P | |
| 292 | US 5443508 | | USP19950822 | 12 | S | |
| 293 | US 5443500 | | USP19950822 | 6 | I | |
| 294 | US 5443498 | | USP19950822 | 12 | V | |
| 295 | US 5443497 | | USP19950822 | 9 | P | |
| 296 | US 5443496 | | USP19950822 | 10 | I | |
| 297 | US 5443495 | | USP19950822 | 10 | P | |
| 298 | US 5443477 | | USP19950822 | 17 | A | |
| 299 | US 5449382 | | USP19950912 | 9 | M | |
| 300 | US 5453090 | | USP19950926 | 6 | M | |
| 301 | US 5456724 | | USP19951010 | 15 | L | |
| 302 | US 5456713 | | USP19951010 | 19 | E | |
| 303 | US 5456694 | | USP19951010 | 12 | D | |
| 304 | US 5458653 | | USP19951017 | 8 | P | |
| 305 | US 5458615 | | USP19951017 | 12 | S | |
| 306 | US 5462781 | | USP19951031 | 20 | S | |
| 307 | US 5464450 | | USP19951107 | 8 | B | |
| 308 | US 5464449 | | USP19951107 | 13 | I | |
| 309 | US 5466242 | | USP19951114 | 12 | S | |
| 310 | US 5476880 | | USP19951219 | 7 | O | |
| 311 | US 5476508 | | USP19951219 | 11 | S | |
| 312 | US 5476505 | | USP19951219 | 5 | C | |
| 313 | US 5476471 | | USP19951219 | 10 | D | |
| 314 | US 5478349 | | USP19951226 | 10 | P | |
| 315 | US 5480437 | | USP19960102 | 9 | P | |
| 316 | US 5480423 | | USP19960102 | 16 | P | |
| 317 | US 5484444 | | USP19960116 | 7 | D | |
| 318 | US 5489295 | | USP19960206 | 15 | E | |
| 319 | US 5496372 | | USP19960305 | 54 | H | |
| 320 | US 5500013 | | USP19960319 | 12 | B | |
| 321 | US 5501706 | | USP19960326 | 20 | M | |
| 322 | US 5504300 | | USP19960402 | 10 | O | |
| 323 | US 5503636 | | USP19960402 | 7 | S | |
| 324 | US 5507771 | | USP19960416 | 7 | S | |
| 325 | US 5507767 | | USP19960416 | 9 | S | |
| 326 | US 5509933 | | USP19960423 | 18 | M | |
| 327 | US 5512291 | | USP19960430 | 14 | M | |
| 328 | US 5514182 | | USP19960507 | 8 | P | |
| 329 | US 5514178 | | USP19960507 | 9 | P | |
| | US 5514176 | | USP19960507 | 3 | I | |
| 331 | US 5522896 | | USP19960604 | 9 | B | |

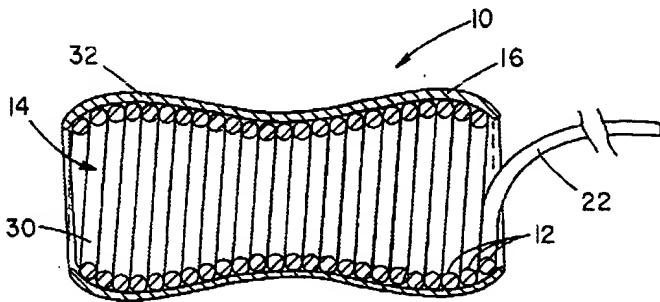


FIG. 4

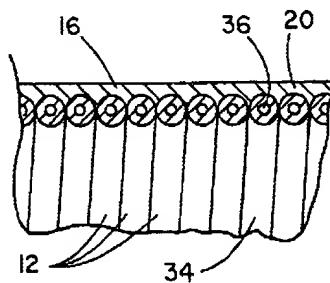


FIG. 5

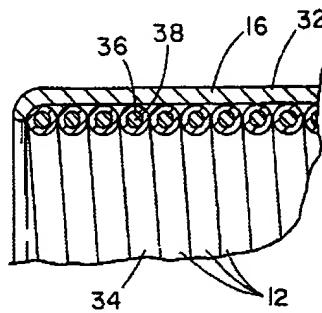
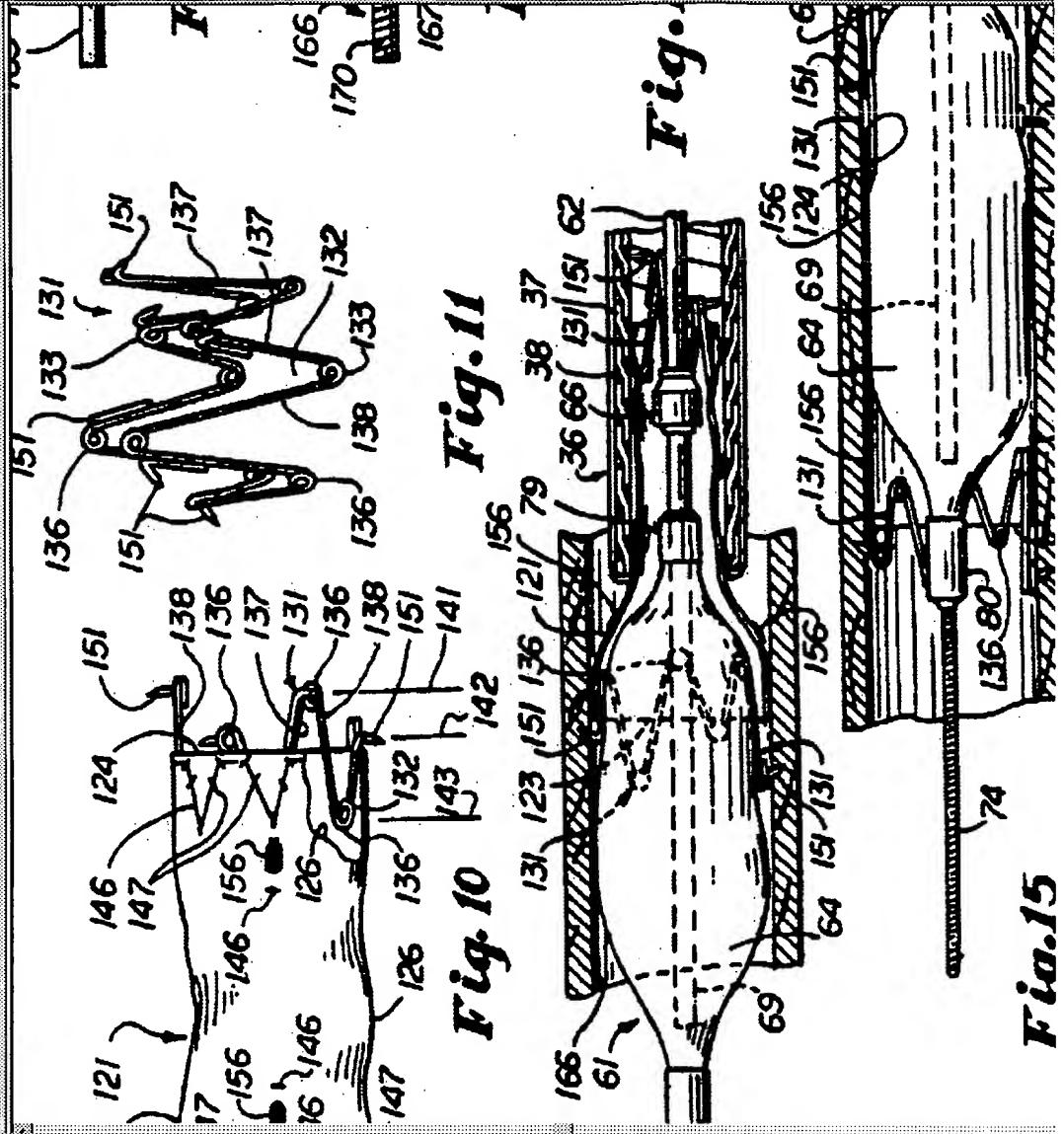


FIG. 6

| Document | I | K | Sou | Lean | Da | Page |
|----------|------------|---|-----|----------|----|------|
| 209 | US 5213580 | | USP | 19930525 | 10 | B |
| 210 | US 5217494 | | USP | 19930608 | 9 | T |
| 211 | US 5217483 | | USP | 19930608 | 5 | I |
| 212 | US 5219363 | | USP | 19930615 | 4 | B |
| 213 | US 5226913 | | USP | 19930713 | 11 | M |
| 214 | US 5236447 | | USP | 19930817 | 15 | A |
| 215 | US 5242451 | | USP | 19930907 | 8 | I |
| 216 | US 5246461 | | USP | 19930921 | 11 | F |
| 217 | US 5246445 | | USP | 19930921 | 13 | D |
| 218 | US 5258030 | | USP | 19931102 | 7 | P |
| 219 | US 5258029 | | USP | 19931102 | 6 | M |
| 220 | US 5258020 | | USP | 19931102 | 9 | M |
| 221 | US 5266073 | | USP | 19931130 | 6 | A |
| 222 | US 5269802 | | USP | 19931214 | 8 | P |
| 223 | US 5271736 | | USP | 19931221 | 8 | C |
| 224 | US 5275416 | | USP | 19940104 | 16 | E |
| 225 | US 5279831 | | USP | 19940118 | 7 | H |
| 226 | US 5282861 | | USP | 19940201 | 11 | O |
| 227 | US 5282860 | | USP | 19940201 | 8 | S |
| 228 | US 5282824 | | USP | 19940201 | 8 | P |
| 229 | US 5282823 | | USP | 19940201 | 9 | I |
| 230 | US 5290305 | | USP | 19940301 | 31 | A |
| 231 | US 5290295 | | USP | 19940301 | 11 | I |
| 232 | US 5292331 | | USP | 19940308 | 8 | E |
| 233 | US 5292321 | | USP | 19940308 | 11 | T |
| 234 | US 5304200 | | USP | 19940419 | 12 | W |
| 235 | US 5306294 | | USP | 19940426 | 6 | S |
| 236 | US 5314492 | | USP | 19940524 | 14 | C |
| 237 | US 5314475 | | USP | 19940524 | 4 | M |
| 238 | US 5314473 | | USP | 19940524 | 7 | P |
| 239 | US 5314472 | | USP | 19940524 | 9 | V |
| 240 | US 5316550 | | USP | 19940531 | 13 | P |
| 241 | US 5316023 | | USP | 19940531 | 16 | M |
| 242 | US RE34632 | | USP | 19940607 | 8 | D |
| 243 | US 5320100 | | USP | 19940614 | 7 | I |
| 244 | US 5330500 | | USP | 19940719 | 8 | S |
| 245 | US 5330490 | | USP | 19940719 | 12 | E |
| 246 | US 5329846 | | USP | 19940719 | 19 | T |
| 247 | US 5344426 | | USP | 19940906 | 12 | M |
| 248 | US 5354308 | | USP | 19941011 | 10 | M |
| 249 | US 5356433 | | USP | 19941018 | 15 | B |



| Document | Kind | Serial | Issue Date | Page |
|---------------|------|-------------|------------|------|
| 3 US 4731073 | | USP19880315 | 11 | A |
| 4 US 4732152 | | USP19880322 | 10 | D |
| 5 US 4850999 | | USP19890725 | 8 | F |
| 6 US 4875480 | | USP19891024 | 7 | D |
| 7 US 5133732 | | USP19920728 | 16 | I |
| 8 US 5211661 | | USP19930518 | 12 | A |
| 9 US 5290305 | | USP19940301 | 31 | A |
| 10 US 5383892 | | USP19950124 | 7 | S |
| 11 US 5387235 | | USP19950207 | 41 | E |
| 12 US 5397359 | | USP19950314 | 9 | M |
| 13 US 5456713 | | USP19951010 | 19 | E |
| 14 US 5480437 | | USP19960102 | 9 | P |
| 15 US 5522894 | | USP19960604 | 14 | B |
| 16 US 5562726 | | USP19961008 | 31 | E |
| 17 US 5562697 | | USP19961008 | 6 | S |
| 18 US 5591228 | | USP19970107 | 27 | M |
| 19 US 5630801 | | USP19970520 | 14 | D |
| 20 US 5649949 | | USP19970722 | 14 | V |
| 21 US 5653727 | | USP19970805 | 14 | I |
| 22 US 5665119 | | USP19970909 | 4 | F |
| 23 US 5676697 | | USP19971014 | 23 | T |
| 24 US 5693089 | | USP19971202 | 40 | M |
| 25 US 5693084 | | USP19971202 | 42 | E |
| 26 US 5713948 | | USP19980203 | 13 | A |
| 27 US 5718159 | | USP19980217 | 16 | P |
| 28 US 5720776 | | USP19980224 | 46 | B |
| 29 US 5746766 | | USP19980505 | 22 | S |
| 30 US 5755777 | | USP19980526 | 31 | E |
| 31 US 5769870 | | USP19980623 | 21 | P |
| 32 US 5776186 | | USP19980707 | 13 | A |
| 33 US 5814006 | | USP19980929 | 5 | T |
| 34 US 5815904 | | USP19981006 | 15 | M |
| 35 US 5824059 | | USP19981020 | 9 | F |
| 36 US 5824053 | | USP19981020 | 11 | H |
| 37 US 5843163 | | USP19981201 | 8 | E |
| 38 US 5843162 | | USP19981201 | 64 | A |
| 39 US 5873906 | | USP19990223 | 27 | P |
| 40 US 5919225 | | USP19990706 | 26 | P |
| 41 US 5928280 | | USP19990727 | 13 | E |
| 42 US 5928279 | | USP19990727 | 17 | S |
| 43 US 5968088 | | USP19991019 | 17 | E |

Pat. Nos. 4,655,771 Wallsten); 4,954,126 (Wallsten); and 5,061,275 (Wallsten et al.), the entireties of which are hereby expressly incorporated herein by reference. As shown in the figures of this patent application, this particular stent 14 is composed of rigid but resiliently flexible ~~thread~~ elements or ~~wires~~ 18. These ~~thread~~ elements or ~~wires~~ 18 are formed of metal, such as an alloy of cobalt, chromium, nickel or molybdenum, wherein the alloying residue is iron. One specific example of a commercially available alloy which may be usable to form the ~~wires~~ 18 of the stent 14 is Elgiloy (The Elgiloy Company, 1565 Fleetwood Drive, Elgin, Ill. 60120). The ~~wires~~ 18 of this stent 14 are arranged in helical configuration about a common longitudinal axis LA. A number of the ~~wires~~ 18 are positioned in substantially parallel relation to one another, but are axially displaced relative to each other. By such arrangement, some of the ~~wires~~ 18 are wound in a first helical direction, while others are wound in a second or opposite helical direction such that they cross on opposite sides of adjacent ones of the ~~wires~~ 18 wound in the first helical direction so as to form a helically braided ~~wire~~ stent as shown in the Figures. This results in the formation of a braided ~~wire~~ stent 14 of generally tubular configuration which is self-expanding and biased to its radially expanded diameter D.sub.2. However, this stent 14 may be radially compressed to a smaller diameter D.sub.1 and radial constraint, as may be applied by the surrounding wall of the tubular delivery catheter 22 shown in FIG. 1, may be applied to hold the stent 14 in such radially compressed state (diameter D.sub.1). Thereafter, when the radial constraint is removed from the stent 14, the stent 14 will resiliently spring back to its radially expanded diameter D.sub.2. The individual, helically wound ~~wires~~ 18 of this particular braided stent 14 move and articulate such that the angular dispositions of the ~~wires~~ 18, relative to one another, will change radial expansion and compression of the stent 14. Also, the longitudinal length of the stent 14 will increase as the stent 14 is radially compressed toward its radially compact configuration D.sub.1, and such length will shorten as the stent 14 expands toward its radially expanded configuration D.sub.2. Thus, the optional PTFE coating 20 is applied to the ~~wires~~ 18 of the stent 14, such coating (described in detail herebelow) is preferably flexible enough to withstand the flexing and movement of the individual ~~wires~~ 18 without cracking or degrading.